CLAIMS

We claim:

1. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a circuit board positioned adjacent to the receptacle;

a plurality of contact tines, each having a first end fixedly attached to the circuit board, a second free end and a contact portion between the first and second ends, the tine contact portions being positioned within the receptacle to be contacted by a corresponding one of the plug contacts and moved in response thereto in a first direction as the plug is inserted into the receptacle, each tine being sufficiently resilient to produce a first force on the tine contact portion against the corresponding plug contact in response to having been moved in the first direction, the tine contact portion of each tine having a tine contact first portion and a tine contact second portion, the tine contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is inserted into the receptacle; and

a plurality of resilient, non-conductive elongated spring arms, each having an independently movable spring member portion within the receptacle positioned adjacent to a corresponding one of the tine contact portions to be engaged by the corresponding tine contact portion when moved in the first direction by the corresponding plug contact as the plug is inserted into the receptacle, each spring arm being configured for the spring member portion thereof to apply a second force on the corresponding tine contact portion against the corresponding plug contact in response to having been moved in the first direction to produce a contact force between the corresponding tine contact portion and plug contact substantially equal to the sum of the first and second forces and to assist return movement of the corresponding tine contact portion in a second direction opposite the first direction when the plug is removed from

the receptacle, the spring member portion of each spring arm having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion including a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the tine contact second portion is in engagement with the spring engagement portion.

2. The connector jack of claim 1 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally extending space therebetween, the space between the lateral members being substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the tine is moved.

3. The connector jack of claim 1 wherein the tine contact first portion is positioned between the first and second ends of the tine, and the tine contact second portion is positioned between the tine contact first portion and the first end of the tine.

4. The connector jack of claim 1 wherein the spring engagement member portion is a free end portion of the spring arm.

5. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a circuit board positioned adjacent to the receptacle;

a plurality of contact tines, each having a first end fixedly attached to the circuit board, a second free end and a contact portion between the first and second ends, the tine contact portions being positioned within the receptacle to be contacted by a corresponding one of the plug contacts and moved in response thereto in a first

direction as the plug is inserted into the receptacle, each tine being sufficiently resilient to produce a first force on the tine contact portion against the corresponding plug contact in response to having been moved in the first direction, the tine contact portion of each tine having a tine contact first portion and a tine contact second portion, the tine contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is inserted into the receptacle; and

a plurality of resilient, non-conductive elongated spring arms, each having an independently movable spring member portion within the receptacle positioned adjacent to a corresponding one of the tine contact portions to be engaged by the corresponding tine contact portion when moved in the first direction by the corresponding plug contact as the plug is inserted into the receptacle, each spring arm being configured for the spring member portion thereof to apply a second force on the corresponding tine contact portion against the corresponding plug contact in response to having been moved in the first direction to produce a contact force between the corresponding tine contact portion and plug contact substantially equal to the sum of the first and second forces and to assist return movement of the corresponding tine contact portion in a second direction opposite the first direction when the plug is removed from the receptacle, the spring member portion of each spring arm having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion having a recess sized to capture the spring engagement portion to restrict lateral movement of the spring engagement portion.

6. The connector jack of claim 5 wherein the tine contact second portion of each tine has a bend therein at least in part forming the recess.

7. The connector jack of claim 6 wherein the tine contact second portion includes a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the

tine contact second portion is in engagement with the spring engagement portion, the lateral members at least in part forming the recess.

8. The connector jack of claim 7 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally extending space therebetween, the space between the lateral members being substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the tine contact is moved.

9. The connector jack of claim 5 wherein the spring engagement member portion is a free end portion of the spring arm.

10. The connector jack of claim 5 wherein the spring engagement member portion is a rounded, free end portion of the spring arm.

11. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a plurality of contact tines extending within the receptacle with each in position for contact by a corresponding one of the plug contacts and movement in response thereto from a first position to a second position when the plug is in the receptacle, each contact tine having a tine contact first portion and a tine contact second portion, the tine contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is in the receptacle; and

a plurality of resilient spring members extending within the receptacle and positioned adjacent to a corresponding one of the contact tines to be engaged by the corresponding contact tine when moved from the first position to the second position by the corresponding plug contact when the plug is in the receptacle, each spring member

being configured to apply a force against the corresponding contact tine in a direction from the second position toward the first position to produce a contact force between the corresponding contact tine and plug contact when the plug is in the receptacle, each spring member having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion including a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the tine contact second portion is in engagement with the spring engagement portion.

12. The connector jack of claim 11 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally extending space therebetween, the space between the lateral members being substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the contact tine is moved.

13. The connector jack of claim 11 wherein the contact tine has a first end and a free second end, the tine contact first portion being positioned between first and second ends of the contact tine, and the tine contact second portion being positioned between the tine contact first portion and the first end of the contact tine.

14. The connector jack of claim 11 wherein the spring engagement member portion is a free end portion of the spring member.

15. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a plurality of contact tines extending within the receptacle with each in position for contact by a corresponding one of the plug contacts and movement in response thereto from a first position to a second position when the plug is in the receptacle, each contact tine having a tine contact first portion and a tine contact second portion, the tine contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is in the receptacle; and

a plurality of resilient spring members extending within the receptacle and positioned adjacent to a corresponding one of the contact tines to be engaged by the corresponding contact tine when moved from the first position to the second position by the corresponding plug contact when the plug is in the receptacle, each spring member being configured to apply a force against the corresponding contact tine in a direction from the second position toward the first position to produce a contact force between the corresponding contact tine and plug contact when the plug is in the receptacle, each spring member having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion having a recess sized to capture the spring engagement portion to restrict lateral movement of the spring engagement portion.

16. The connector jack of claim 15 wherein the tine contact second portion of each contact tine has a bend therein at least in part forming the recess.

17. The connector jack of claim 16 wherein the tine contact second portion includes a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the tine contact second portion is in engagement with the spring engagement portion, the lateral members at least in part forming the recess.

18. The connector jack of claim 17 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally

extending space therebetween, the space between the lateral members being substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the contact tine is moved.

19. The connector jack of claim 15 wherein the spring engagement member portion is a free end portion of the spring member.

20. The connector jack of claim 15 wherein the spring engagement member portion is a rounded, free end portion of the spring member.

21. The connector jack of claim 15 wherein each of the contact tines has a first end supported by a support member, a second free end and a contact portion between the first and second ends positioned to be contacted by a corresponding one of the plug contacts.

22. The connector jack of claim 15 wherein each spring member is configured to apply the force against the corresponding contact tine when the corresponding contact tine is in the second position in a sufficient amount to at least assist in moving the corresponding contact tine to the first position when the plug is removed from the receptacle.

23. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a plurality of contact tines, each having a contact portion within the receptacle positioned to be engaged by a correspondingly positioned ones of the plug contacts when the plug is inserted into the receptacle, the tine contact portion of each contact tine having a tine contact first portion and a tine contact second portion, the tine

contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is inserted into the receptacle; and

a plurality of resilient spring members, each configured to apply a reaction force to one of the contact tines when engaged by the correspondingly positioned plug contact in a direction to generate a supplemental contact force between the contact tine and the correspondingly positioned plug contact, each spring member having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion including a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the tine contact second portion is in engagement with the spring engagement portion.

24. The connector jack of claim 23 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally extending space therebetween, the space between the lateral members being substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the contact tine is moved.

25. The connector jack of claim 23 wherein the contact tine has a first end and a free second end, the tine contact first portion being positioned between first and second ends of the contact tine, and the tine contact second portion being positioned between the tine contact first portion and the first end of the contact tine.

26. The connector jack of claim 23 wherein the spring engagement member portion is a free end portion of the spring member.

27. A connector jack, usable with a plug having a plurality of plug contacts, the jack comprising:

a body having a receptacle sized and configured to receive the plug therein;

a plurality of contact tines, each having a contact portion within the receptacle positioned to be engaged by a correspondingly positioned ones of the plug contacts when the plug is inserted into the receptacle, the tine contact portion of each contact tine having a tine contact first portion and a tine contact second portion, the tine contact first portion being positioned for contact by the corresponding one of the plug contacts when the plug is inserted into the receptacle; and

a plurality of resilient spring members, each configured to apply a reaction force to one of the contact tines when engaged by the correspondingly positioned plug contact in a direction to generate a supplemental contact force between the contact tine and the correspondingly positioned plug contact, each spring member having a spring engagement portion, the tine contact second portion being positioned for engagement with the spring engagement portion, the tine contact second portion having a recess sized to capture the spring engagement portion to restrict lateral movement of the spring engagement portion.

28. The connector jack of claim 27 wherein the tine contact second portion of each contact tine has a bend therein at least in part forming the recess.

29. The connector jack of claim 28 wherein the tine contact second portion includes a pair of lateral members spaced apart sufficiently to receive and retain therebetween the spring engagement portion to limit lateral movement thereof when the tine contact second portion is in engagement with the spring engagement portion, the lateral members at least in part forming the recess.

30. The connector jack of claim 29 wherein the tine contact second portion is elongated and the lateral members extend longitudinally along at least a portion of the tine contact second portion and define a laterally limited, longitudinally extending space therebetween, the space between the lateral members being

substantially unobstructed to permit sliding movement of the spring engagement portion through the space as the contact tine is moved.

31. The connector jack of claim 27 wherein the spring engagement member portion is a free end portion of the spring member.

32. The connector jack of claim 27 wherein the spring engagement member portion is a rounded, free end portion of the spring member.

33. The connector jack of claim 27 wherein each of the contact tines has a first end supported by a support member and a second free end with the contact portion located between the first and second ends in a position to be engaged by the correspondingly positioned one of the plug contacts when the plug is inserted into the receptacle.